Agency for Healthcare Research and Quality
Advancing Excellence in Health Care

NATIONAL GUIDELINE CLEARINGHOUSE

General

Guideline Title

Occupational guidance for physical and shift work of pregnant women in the United States

Bibliographic Source(s)

University of Texas at Austin School of Nursing, Family Nurse Practitioner Program. Occupational guidance for physical and shift work of pregnant women in the United States. Austin (TX): University of Texas at Austin, School of Nursing; 2014. 13 p. [31 references]

Guideline Status

This is the current release of the guideline.

Recommendations

Major Recommendations

Strength of recommendations (A, B, C, D, I) and quality of evidence (High, Moderate, Low) are defined at the end of the "Major Recommendations" field.

Overall, there is little evidence to support the primary care provider (PCP) to advise healthy pregnant women who work to restrict their activity. Additionally, the PCP may monitor any condition that may affect pregnancy outcomes during the pregnancy. Collaboration with the patient on a case-by-case approach should be utilized in recommending restrictions. The following are recommended components of a systematic evaluation for a pregnant worker to determine if there is the need for work restrictions or modifications.

1. Perform a focused assessment:
    - Obtain obstetrical/gynecological history to verify a prognosis of normal pregnancy.
    - Assess current employment, job title and job satisfaction.
    - Conduct an occupational health interview.
    - Determine work schedule, responsibilities, recent changes, or promotions.
    - Obtain information of work physical activity assessments including type, frequency, intensity, duration and compare to pre-pregnancy activity levels (Evenson & Pompeii, 2010).
2. Identify potential work-related risk factors:
    - Long work schedule is defined as greater than 40 hours per week that includes extended day and extended week schedules (Palmer, Bonzini, & Bonde, 2013).
    - Multiple employments (e.g., full-time job plus part-time employment or several part-time jobs).
    - Frequent mandatory or voluntary overtime scheduled.
    - Shift work is defined as any schedule other than 0700-1700, five days a week (Rosa & Colligan, 1997).

- Night work, swing shifts and rotating or permanent off-hour shifts with limited recovery time (e.g., employee with less than 3 days between shift swings) (Rosa & Colligan, 1997).
- Scheduled overtime may be mandatory or voluntary overtime and occurs when the employee is working over and above that specified time for full-time employment.
- Climbing stairs is described as repetitive stair climbing when the employee climbs stairs 4 or more times in an 8-hour shift (Indiana University Health, 2012).
- Bending or stooping is trunk bending for greater than 1 hour per day in late pregnancy (Bonzini et al., 2009).
- Manual lifting during pregnancy should consider lifting patterns such as the distance objects are held in front of the body while lifting and the height the object is lifted from the floor. Heavy lifting is described as lifting 25 pounds or more (Snijder et al., 2012).
- Prolonged hours standing is defined as greater than 3 or 4 hours of continuous standing (Palmer et al., 2013).

3. Determine if a work restriction is necessary during pregnancy.
4. Make recommendations to the woman's employer for reasonable accommodation of any necessary work restrictions based on the above risk factors.
   Physical Activity

   - In an uncomplicated normal pregnancy, the following work schedule restrictions may be followed:
     - Sedentary activities until 40 weeks or beginning of labor
     - Light activities until 38 weeks
     - Moderate activities until 32 weeks
     - Heavy activities until 26 weeks
     - Very heavy activities until 20 weeks

   (Medical Disability Advisor, 2014; Bonzini, Coggon, & Palmer, 2007; Evenson & Pompeii, 2010; Both et al., 2010)

   Manual Lifting

   - Maximum recommended weight for infrequent lifting during pregnancy ranges from 17 to 36 pounds for the first 20 weeks and from 17 to 26 pounds for greater than 20 weeks (MacDonald et al., 2013). For repetitive short duration and long duration lifting refer to *Recommended weight limits in early and late pregnancy for three lift frequency patterns* (MacDonald et al., 2013; Waters et al., 2014).
5. Render a placement decision in compliance with Americans with Disabilities Act (ADA) and the Family Medical Leave Act (FMLA) regarding the woman's physical ability to do a particular job or the need for job protected unpaid leave related to pregnancy or prenatal care.
6. Recognize the patient's legal protection against pregnancy discrimination and the Title VII of the Civil Rights Act of 1964, as amended by the Pregnant Workers under the ADA.

Counseling

- Advise patient of her physical and work shift pregnancy risk potential (relative risk [RR]; odds ratios [OR] ranges as published).

Long Working Hours

- Overall, long working hours affect only a low to moderate risk (RR 1.04-1.36; OR 1.20-1.43) for low birth weight (LBW), small for gestational age (SGA) baby, intrauterine growth restriction (IUGR), and preterm birth (Bonde et al., 2013; Bonzini, Coggon, & Palmer, 2007; Both et al., 2010; Mocevic et al., 2014; Palmer et al., 2013; NHS Plus, Royal College of Physicians, Faculty of Occupational Medicine, 2009; Snijder et al., 2012; Whelan et al., 2007). (Good; Grade A)
- Long working hours are inconsistently (OR 1.3-1.06) associated with an increased risk of pre-eclampsia and pregnancy induced hypertension (PIH) (Bonzini et al., 2007; Chang et al., 2009; NHS Plus, Royal College of Physicians, Faculty of Occupational Medicine, 2009). (Good; Grade A)

Shift Work

- Shift and night work is associated with a low to moderate risk (RR 1.07-3.0; OR 0.73-4.3) for adverse pregnancy outcomes (Bonde et al, 2013; Bonzini, Coggon, & Palmer, 2007; Bonzini et al., 2009; Bonzini et al., 2011; Both et al., 2010; Croteau, Marcoux, & Brisson, 2006; Lin et al., 2011; Palmer et al, 2013; NHS Plus, Royal College of Physicians, Faculty of Occupational Medicine, 2009: Snijder et al., 2012; Quansah & Jaakkola, 2010.) (Good; Grade A)

Prolonged Standing

- In general, prolong standing for greater than three hours per day results in no more than a low to moderate risk (RR 1.07-2.0; OR 0.95-1.34) for adverse pregnancy outcomes (Abeysena, Jayawardana, & De A Seneviratne, 2009; Bonde et al., 2013; Bonzini, Coggan, & Palmer , 2007; Palmer et al., 2013; NHS Plus, Royal College of Physicians, Faculty of Occupational Medicine, 2009; Snijder et al., 2012; Croteau, Marcoux, & Brisson, 2006). (Good; Grade A)

Heavy Physical Activities and Lifting/Bending/Climbing

- Overall, during the first 34 weeks of pregnancy, work activities to which the woman is accustomed prior to pregnancy offers a low to moderate risk (RR 1.02-1.43; OR 0.85-3.39) of adverse pregnancy outcomes (Abeysena, Jayawardana, & De A Seneviratne, 2009; Bonde et al., 2013; Bonzini, Coggon, & Palmer, 2007; Both et al., 2010; Mocevic et al., 2014; Palmer et al., 2013; NHS Plus, Royal College of Physicians, Faculty of Occupational Medicine, 2009; Snijder et al., 2012). (Good; Grade A)
- Trunk bending for more than one hour a day after 34 weeks gestation offers a moderate risk (RR 1.25) for reduced fetal head circumference (Bonzini et al., 2009). (Fair; Grade C)
- There is limited evidence of risk (OR 3.39) for spontaneous abortion from heavy lifting (Lee & Jung, 2012). (Fair; Grade B)

Multiple Risk Exposures

- A combination of risk exposures is associated with higher relative risks for adverse pregnancy outcomes than the individual risk exposures alone. Being exposed to two or more risk exposures affected birth weight less than 3000g (OR 2.44), less than 2500 g (OR 4.65), and preterm labor (OR 5.18) (Abeysena, Jayawardana, & De A Seneviratne, 2009; Bonzini et al., 2009; Croteau, Marcoux, & Brisson, 2006; Niedhammer et al., 2009). (Good; Grade B)
- Design an individualized plan to lower the patient's exposure; with the patient's permission, collaborate with the employer's occupational health physician/nurse or human resource representative.
- Counsel patient on the dual demands of career and childbearing/childrearing and need for sleep, nutrition, and physical activity during pregnancy and postpartum.
- Counsel patient that she may be able to return to work after 4-6 weeks if she had an uncomplicated vaginal delivery, and 8 weeks if she had an uncomplicated Cesarean delivery (Medical Disability Advisor, 2014).
- Provide pregnancy wellness education, resources, or referral for support and guidance. An example of educational material is the March of Dimes resources
- Follow-up throughout pregnancy assessing for work activity complications.

Resources concerning legal issues and physical activity assessment are provided in the original guideline document.

Definitions:

Grading of Recommendations (Based on the U.S. Preventive Services Task Force [USPSTF] Ratings)

A: The USPSTF recommends the service. There is high certainty that the net benefit is substantial. Offer or provide this service.

B: The USPSTF recommends the service. There is high certainty that the net benefit is moderate or there is moderate certainty that the net benefit is moderate to substantial. Offer or provide this service.

C: The USPSTF recommends selectively offering or providing this service to individual patients based on professional judgment and patient preferences. There is at least moderate certainty that the net benefit is small. Offer or provide this service for selected patients depending on individual circumstances.

D: The USPSTF recommends against the service. There is moderate or high certainty that the service has no net benefit or that the harms outweigh the benefits. Discourage the use of this service.

I: The USPSTF concludes that the current evidence is insufficient to assess the balance of benefits and harms of the service. Evidence is lacking, of poor quality, or conflicting, and the balance of benefits and harms cannot be determined. If the service is offered, patients should understand the uncertainty about the balance of benefits and harms.

Quality of Evidence (Based on USPSTF Ratings)

High: The available evidence usually includes consistent results from well-designed, well-conducted studies in representative primary care populations. These studies assess the effects of the preventive service on health outcomes. This conclusion is therefore unlikely to be strongly affected by the results of future studies.

Moderate: The available evidence is sufficient to determine the effects of the preventive service on health outcomes, but confidence in the estimate

is constrained by such factors as:

- The number, size, or quality of individual studies.
- Inconsistency of findings across individual studies.
- Limited generalizability of findings to routine primary care practice.
- Lack of coherence in the chain of evidence.

As more information becomes available, the magnitude or direction of the observed effect could change, and this change may be large enough to alter the conclusion.

Low: The available evidence is insufficient to assess effects on health outcomes. Evidence is insufficient because of:

- The limited number or size of studies.
- Important flaws in study design or methods.
- Inconsistency of findings across individual studies.
- Gaps in the chain of evidence.
- Findings not generalizable to routine primary care practice.
- Lack of information on important health outcomes.

More information may allow estimation of effects on health outcomes.

Clinical Algorithm(s)

None provided

Scope

Disease/Condition(s)

- Pregnancy
- Work-related pregnancy complications

Guideline Category

Counseling

Evaluation

Management

Prevention

Risk Assessment

Clinical Specialty

Family Practice

Nursing

Obstetrics and Gynecology

Preventive Medicine

Intended Users

Advanced Practice Nurses

Nurses

Physician Assistants

Physicians

Public Health Departments

Guideline Objective(s)

To provide evidence-based counseling recommendations for pregnant women who are exposed to physical exertion and shift work

Target Population

Employed pregnant women with uncomplicated singleton pregnancies

Interventions and Practices Considered

1. Focused assessment
    - Obstetrical/gynecological history to verify a pregnancy prognosis
    - Assessment of current employment
    - Occupational health interview
    - Determination of work schedule, responsibilities, recent changes, or promotions
    - Obtaining information on work-related physical activity
2. Identifying potential work-related risk factors, including long work schedule, multiple employment, frequent overtime, shift work, night work, repetitive stair climbing, bending, stooping, manual lifting, prolonged standing
3. Determining if a work restriction is necessary during pregnancy
4. Making recommendations to the woman's employer for reasonable accommodation of any necessary work restrictions
5. Counseling patient concerning her physical and work shift pregnancy risk potential

Major Outcomes Considered

- Adverse fetal outcomes (fetal morbidity)
- Adverse maternal outcomes (maternal morbidity)
- Intrauterine growth retardation (IUGR)
- Low birth weight (LBW)
- Preterm birth, labor, or preterm rupture of membranes (PROM)
- Pre-eclampsia
- Pregnancy induced hypertension (PIH)
- Small for gestational age (SGA)
- Spontaneous abortion (SAB)
- Stillbirth

Methodology

Methods Used to Collect/Select the Evidence

Hand-searches of Published Literature (Primary Sources)

Hand-searches of Published Literature (Secondary Sources)

Searches of Electronic Databases

Searches of Unpublished Data

Description of Methods Used to Collect/Select the Evidence

The evidence was based on review of published guidelines (National Guideline Clearinghouse [NGC], Centers for Disease Control and Prevention [CDC], National Institute for Occupational Safety and Health [NIOSH], American College of Obstetricians and Gynecologists [ACOG], Society of Obstetricians and Gynaecologists of Canada [SOGC]) and a systematic review of multiple databases. Grey literature from Google Scholar and UpToDate™ was also examined and hand searches were performed for relevant matches for the guideline developer's query in occupational health journals. The systematic review undertaken used the databases of: Cumulative Index to Nursing and Allied Health Literature (CINAHL), Cochrane Library, PsycINFO, PubMed, and Scopus for the timeframe of January 2006 through February 2014. Search strategies included using the search terms *shift work* and *pregnancy outcomes* with the Boolean connector AND. Additional search terms were added to each database searched with the Boolean connector OR and included: preterm birth, gestational age, small for gestational age, fetal growth restriction, pregnancy complications, pre-eclampsia, reproductive health, work schedule tolerance, work, workload, stillbirth, spontaneous abortion.

Advanced database searches were filtered for (inclusion criteria) peer-reviewed articles published in the English language about female human beings. Articles were excluded from the review (exclusion criteria) if no pregnancy outcomes were reported or if participants had multiple-birth pregnancies, had a history of chronic illnesses or pregnancy complications, or were not employed during their reported pregnancy. Of articles retrieved from the databases, 31 articles met two reviewers' selection for critical appraisal after abstract review. Articles were excluded primarily for not reporting the pregnancy outcomes addressed by the query purpose of physical or shift work risk during pregnancy. Articles excluded related to physiology of pregnancy, chronic illnesses, and pregnancy complications or did not involve employment of health pregnant women.

Number of Source Documents

31 articles met two reviewers' selection for critical appraisal after abstract review

Methods Used to Assess the Quality and Strength of the Evidence

Subjective Review

Weighting According to a Rating Scheme (Scheme Given)

Rating Scheme for the Strength of the Evidence

Quality of Evidence (Based on U.S. Prevention Services Task Force [USPSTF] Ratings)

High: The available evidence usually includes consistent results from well-designed, well-conducted studies in representative primary care populations. These studies assess the effects of the preventive service on health outcomes. This conclusion is therefore unlikely to be strongly affected by the results of future studies.

Moderate: The available evidence is sufficient to determine the effects of the preventive service on health outcomes, but confidence in the estimate is constrained by such factors as:

- The number, size, or quality of individual studies.
- Inconsistency of findings across individual studies.
- Limited generalizability of findings to routine primary care practice.
- Lack of coherence in the chain of evidence.

As more information becomes available, the magnitude or direction of the observed effect could change, and this change may be large enough to alter the conclusion.

Low: The available evidence is insufficient to assess effects on health outcomes. Evidence is insufficient because of:

- The limited number or size of studies.
- Important flaws in study design or methods.
- Inconsistency of findings across individual studies.
- Gaps in the chain of evidence.
- Findings not generalizable to routine primary care practice.
- Lack of information on important health outcomes.

More information may allow estimation of effects on health outcomes.

Methods Used to Analyze the Evidence

Review of Published Meta-Analyses

Systematic Review with Evidence Tables

Description of the Methods Used to Analyze the Evidence

All panel members received critical appraisal training and participated in the critical appraisal of the selected articles. Complete agreement of critical appraisals was reached for the included articles.

Journal articles were analyzed and selected based on the caliber of study design, methodology, number of participants, and the suitability of target population. In addition to evidence that was graded and used to formulate recommendations, additional literature was used to inform the reader of clinical practices. This literature was not given an evidence grade and is instead identified as a reference throughout the document.

Methods Used to Formulate the Recommendations

Expert Consensus

Description of Methods Used to Formulate the Recommendations

A convened panel of family nurse practitioner students at the University of Texas developed this clinical guideline after reviewing and analyzing the research and guidelines of expert professional organizations and clinicians.

Rating Scheme for the Strength of the Recommendations

Grading of Recommendations (Based on the U.S. Preventive Services Task Force [USPSTF] Ratings)

A: The USPSTF recommends the service. There is high certainty that the net benefit is substantial. Offer or provide this service.

B: The USPSTF recommends the service. There is high certainty that the net benefit is moderate or there is moderate certainty that the net benefit is moderate to substantial. Offer or provide this service.

C: The USPSTF recommends selectively offering or providing this service to individual patients based on professional judgment and patient preferences. There is at least moderate certainty that the net benefit is small. Offer or provide this service for selected patients depending on individual circumstances.

D: The USPSTF recommends against the service. There is moderate or high certainty that the service has no net benefit or that the harms outweigh the benefits. Discourage the use of this service.

I: The USPSTF concludes that the current evidence is insufficient to assess the balance of benefits and harms of the service. Evidence is lacking, of poor quality, or conflicting, and the balance of benefits and harms cannot be determined. If the service is offered, patients should understand the uncertainty about the balance of benefits and harms.

Cost Analysis

A formal cost analysis was not performed and published cost analyses were not reviewed.

Method of Guideline Validation

External Peer Review

Internal Peer Review

Description of Method of Guideline Validation

Initially the full draft of the guideline was submitted and reviewed by an internal panel of composed of University of Texas at Austin School of Nursing faculty and clinicians. An occupational medicine physician expert reviewed the final draft. Edits and suggestions were incorporated and the guideline was once again subjected to Internal Review prior to submission for publication.

Evidence Supporting the Recommendations

References Supporting the Recommendations

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Palmer KT, Bonzini M, Bonde JP, Multidisciplinary Guideline Development Group, Health and Work Development Unit, Royal College of Physicians, Faculty of Occupational Medicine. Pregnancy: occupational aspects of management: concise guidance. Clin Med. 2013 Feb;13(1):75-9. PubMed

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Quansah R, Jaakkola JJ. Occupational exposures and adverse pregnancy outcomes among nurses: a systematic review and meta-analysis. J Womens Health (Larchmt). 2010 Oct;19(10):1851-62. PubMed

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Type of Evidence Supporting the Recommendations

The type of supporting evidence is identified and graded for most recommendations (see the "Major Recommendations" field).

Benefits/Harms of Implementing the Guideline Recommendations

Potential Benefits

- Increased knowledge gained from evidence-based educational counseling of pregnant workers who participate in shiftwork and heavy physical labor
- Improved pregnant worker's mental and physical comfort
- Decreased fetal and maternal morbidity

Potential Harms

Work restrictions could lead to sedentary behavior and deconditioning, or loss of needed income.

Qualifying Statements

Qualifying Statements

- The recommendations in this guideline are only directed at women with uncomplicated singleton pregnancies. Women with complicated or multiple-birth pregnancies should be evaluated on a case-by-case basis by their obstetric healthcare provider.
- These guidelines are to be used by medical professionals only. They are intended to supply primary care providers with a framework to counsel and manage women regarding physical and shift work risks during normal singleton pregnancy. Medical advice should be individualized per patient and practitioner.

Implementation of the Guideline

Description of Implementation Strategy

An implementation strategy was not provided.

Institute of Medicine (IOM) National Healthcare Quality Report Categories

IOM Care Need

Staying Healthy

IOM Domain

Effectiveness

Patient-centeredness

Identifying Information and Availability

Bibliographic Source(s)

University of Texas at Austin School of Nursing, Family Nurse Practitioner Program. Occupational guidance for physical and shift work of pregnant women in the United States. Austin (TX): University of Texas at Austin, School of Nursing; 2014. 13 p. [31 references]

Adaptation

Not applicable: The guideline was not adapted from another source.

Date Released

2014

Guideline Developer(s)

University of Texas at Austin School of Nursing, Family Nurse Practitioner Program - Academic Institution

Source(s) of Funding

University of Texas at Austin, School of Nursing, Family Nurse Practitioner Program

Guideline Committee

Practice Guidelines Committee

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Financial Disclosures/Conflicts of Interest

There is no relationship between the developers and any companies or organizations that could influence the development of the guideline.

Guideline Status

This is the current release of the guideline.

Guideline Availability

Electronic copies: None available.

Print copies: Available from the University of Texas at Austin, School of Nursing. 1700 Red River, Austin, Texas, 78701-1499, Attn: Nurse Practitioner Program

Availability of Companion Documents

None available

Patient Resources

None available

NGC Status

This NGC summary was completed by ECRI Institute on August 6, 2014.

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